

Quantity and Authorship of GIS Articles in Library and Information Science Literature, 1990-2005

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ABSTRACT. Geographers and Library and Information Scientists have similar perspectives on information access. There is an opportunity for technologies to be shared by the two disciplines, such as a geographic information system or GIS. GIS has the potential of offering technological advances to library and information scientists as well as to their partnering institutions. This investigation examines the publishing trends of articles on GIS indexed in *Library Literature & Information Science* and *Library, Information Science & Technology Abstracts* databases during a 16-year span from 1990 to 2005 to determine growth in the quantity of articles published on the subject as well as author affiliation. doi:10.1300/J122v27n03_05 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2007 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. GIS, geographic information systems, authorship analysis, bibliometric analysis

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INTRODUCTION

Geographers and Library and Information Scientists have similar perspectives on information access (Boxall 2003). According to Boxall (2003), both are concerned with

how the user views “information,” how they gain repeated or perpetual access, how access (through description/metadata) can be made intuitive and information discovery a more accurate process and other issues that have connections with cognitive science (areas such as human/computer interaction). (p. 19)

With these commonalities, there is an opportunity for technologies to be shared by the two disciplines, such as a geographic information system.

A geographic information system or GIS is “a computer system capable of capturing, storing, analyzing and displaying geographically referenced information” (United States Geological Survey 2005). A GIS can be used as an analytical, presentational, and teaching device. GIS is an interdisciplinary tool, which can be used as a framework for research in areas such as sociology, history, geography, and others. GIS resources are powerful not only as display tools, but because they allow users to perform spatial analyses, to examine trends over time and to model future scenarios (DeCandido 2003).

Both library and information science and GIS involve common aspects of information administration and organization such as metadata (cataloging), information management (collection), access and sharing, and preservation (Boxall 2003). Therefore, a GIS has great potential for improving library service (Dorman 2002).

A GIS can be used to determine the geographic market for products and services necessary in a community (Koontz and Jue 2000). GIS applications are available that can map library and demographic statistical data to create maps, which can relate patron, collection, and circulation data to census, state, and local data in order to display their relationships visually (Dorman 2002). Additionally, providing GIS software may someday be a common service for libraries to offer as is done currently with other types of computer hardware and software (Koontz and Jue 2000). Many academic libraries have been offering GIS for the past decade but public libraries are just beginning to offer this technology (DeCandido 2003).

STATEMENT OF THE PROBLEM

GIS has the potential of offering many technological advances to library and information scientists as well as to their partnering institutions. Although GIS software was developed in the early 1960s, it was not until the early 1990s when it became financially feasible for many institutions (Koontz and Jue 2000). This investigation examines the publishing trends of articles on GIS found in Library and Information Science journals during a 16-year span from 1990 to 2005 to determine growth in the quantity of articles published on the subject as well as authorship affiliation.

Related Subproblems

1. How many articles were published on GIS in library and information science journals from 1990 to 2005?
2. What are the author affiliations of those articles from 1990 to 2005?

Hypotheses

H1: With an increased awareness of the technology of GIS, there are an increasing number of articles published on GIS in library journals per year in the past 16 years.

H2: There is a change in the author affiliation of articles on GIS in the last 16 years from those with a background in Geography or Computer Science to those with a Library and Information Science background.

Assumptions

1. It is assumed that the items indexed in Library Literature & Information Science and Library, Information Science & Technology Abstracts databases are indexed accurately and are representative of the literature in the field.
2. It is assumed that the author information in the articles examined in this study is accurate.

Definitions

GIS article refers to a journal article whose primary subject focus is on GIS

Feature article refers to a scholarly narrative on a specific topic.

Research article refers to an article that includes original research and primary sources.

Author affiliation refers to both the organization with which the author was affiliated when the article was published and the professional title of the author as listed by the article.

Limitations

This study was limited to research and feature articles found in two major LIS databases: *Library Literature & Information Science* accessed through Dialog and *Library, Information Science & Technology Abstracts* accessed through EBSCOhost. *The Library Literature & Information Science* database indexes articles from some 390 key library and information science periodicals. *LISTA* indexes articles from over 600 periodicals in addition to research reports and proceedings.

Only feature or research articles were considered for this study. Editorials, news items, book reviews, letters to the editor, speeches, and brief communications were excluded. If the article was labeled as a “feature article” by the databases and later ascertained to be outside the parameters, it was disregarded.

This study focused on two areas of published articles: publication pattern and author affiliation from the years 1990 through 2005.

IMPORTANCE OF THE STUDY

Libraries are forerunners in the fields of administration and analysis of information (Boxall 2003). Making information accessible and easy to understand is the goal of libraries everywhere. A GIS organizes and presents data in ways that allow for greater understanding of information. GIS is growing in importance for libraries because they allow users to examine new types of information in new ways.

GIS technology has existed for several decades, but the decrease in computing costs and the enhancement to software interfaces have only recently launched GIS as a research and analysis tool for a wide audience. During the 1990s GIS sales increased dramatically—in 1995 alone, GIS software sales totaled \$862 million (Ellis 1997).

Because of the versatility of a GIS as a research tool, the multiplicity of applications available for its use, and the increasing affordability of the technology for purchase, a GIS has become an increasingly valuable

tool for many fields including the field of library and information science. This analysis may provide insight into the adoption and use of this technology by the field of LIS and to illustrate its growth over time in the LIS literature.

Journal articles are popular because of the quick dissemination of information (Goedeken 2003). In the academic community, professional journals have served as a fundamental method for the exchange and communication of scholarly information (Al-Ghamdi et al. 1998). Topical trends in publishing provide a picture of what scholars in the community have deemed worthy of investigation. Does interest in a subject such as GIS remain strong over time? Is a trend discernable in the pattern of GIS authorship affiliation in the library and information science literature?

REVIEW OF THE RELATED LITERATURE

Authorship analyses and “literature of” studies have become major topics of discussion in the literature and important forms of research in a variety of professional fields. Studies focus on authorship patterns, which include characteristics of the authors. They also investigate topical trends in the publication of articles in professional journals. Understanding the basis of authorship productivity and “literature of” studies is essential for article evaluation. The following review of literature demonstrates how these analysis techniques have been applied for investigation as well as the categories and elements found most relevant to evaluation.

Authorship Analyses

Al-Ghamdi et al. (1998) analyzed authorship patterns of feature articles in *JASIS* (*Journal of the American Society for Information Science*). Author characteristics such as academic or professional affiliation, gender, location, and frequency of authorship were analyzed. These characteristics were tabulated by year. Trends were determined from the analysis of this data. The study indicated an increase in the number of Library and Information Science authors. It also noted that the changing composition of the elements analyzed warranted further study of these trends to understand their broader implications.

Allen and Vellenga evaluated author affiliations in transportation and logistics academic journals (1987). The authors gathered information with respect to the affiliation of published authors in transportation and

logistics journals. Categories were determined for classification of the author's affiliations. If the affiliation of the author was noted as academic, the institution of the author as well as the academic department or college they were associated with was noted.

Goedeken investigated the topical areas of importance in the *Journal of Library History* and *Libraries and Culture* (2003). The author examined 251 articles, which consisted of "fully developed papers, reports, and essays based on original research and primary resources." Limiting the study to these items provided a review of only the most significant materials in these journals. The institutional affiliation and professional position of each author were also noted for each article selected for review.

Ender examined the first 25 volumes of the journal of *Armed Forces & Society* (2001). Like other research on authorship and affiliation, the focus was on specific topics such as (1) single versus multiple authorship, (2) author-article ratio, (3) the sex of the authors and their order by sex, and (4) the location of the authors in a geographic region by their institutional affiliation. This study replicates and expands on previous studies of authorship with a focus on a specialty journal. It provides a comparative understanding of publication pattern and authorship.

"Literature of" Studies

Kern analyzed article subject content and trends in engineering management literature (2002). Using article subject classifications, the content of articles was analyzed to gain insight on how the field was evolving. Categories were created to classify each article and each category evaluated by year for trends.

Welsh (2005) examined the publishing and citing patterns found in telemedicine literature indexed in the *TIE (Telemedicine Information Exchange)* online database. Citation counts in the database traced the growth and development of telemedicine literature and identified the most prolific authors. Citation counts in SciSearch-cited reference database indicated the most cited telemedicine journals and authors and were used to compute journal impact factors.

METHODOLOGY

In order to determine publication trends of GIS articles, bibliographic data of 16 years (1990-2005) were gathered from the *Library Literature &*

Information Science and Library, Information Science & Technology Abstracts databases. The search parameters used in the databases are the terms “geographic information systems (GIS)” or “geospatial,” limited to English language and published from 1990 to 2005. Editorials, news items, book reviews, letters to the editor, speeches, and brief communications were eliminated. If any of the retrieved items were not deemed feature or research articles or were not focused on the topic of GIS, they were disregarded.

Author affiliation was noted for each article included by the parameters discussed earlier. For the purposes of this study, author affiliation refers to both the organization with which the author was affiliated when the article was published, and the professional title of the author as listed by the article. Using these two aspects, each author’s affiliation was identified and assigned to one of the following categories: “Academic Librarian,” “LIS Academic,” “Other Academic,” “Corporate,” and “Government.”

“Academic Librarian” included those authors identified as librarians who were affiliated with a college or university. “LIS Academic” included those authors who were LIS academic instructors, researchers, or graduate students. “Other Academic” referred to instructors or researchers in a college or university department other than LIS. “Corporate” referred to those authors whose affiliation was with a business, industry, or organization other than academic or government. “Government” referred to those authors whose affiliation was with any branch or agency of government be that of local, state, federal, or foreign government.

RESULTS

Using the described methodology for the retrieval of documents in the databases yielded 305 items. After duplicates were removed, 146 items were found to have met the requirements of being a research or feature article. The collected data from these articles were compiled in an Excel spreadsheet and analyzed.

The 146 GIS articles appeared in 69 different LIS publications. Fifty-one periodicals had one GIS-related article each. Those with multiple articles include:

- Twenty-four in *The Journal of Academic Librarianship*
- Nine in *International Journal of Geographical Information Science*

- Six in Information Technology and Libraries, Government Information Quarterly, INSPEL, Liber Quarterly, and Meridian
- Five in Issues in Science & Technology Librarianship and Journal of the American Society for Information Science and Technology
- Four in International Journal of Information Management and Library Hi Tech
- Two in Illinois Libraries, Information Infrastructure & Policy, Information Systems Management, Journal of Global Information Management, Journal of Information Science, Library Quarterly and Science & Technology Libraries.

H1: With an increased awareness of the technology of GIS, there are an increasing number of articles published on GIS in library journals per year in the past 16 years.

The 146 GIS articles in library and information science journals were sorted by year of publication. Table 1 lists the results by year. The year 1991 provided no results. The year 2005 yielded 19, the highest numbers for the years researched. The years 1999 and 2001 each yielded 18,

TABLE 1. Number of GIS Articles Published by Year in LIS Journals

Year	Number of Articles
1990	2
1991	0
1992	2
1993	3
1994	5
1995	16
1996	2
1997	13
1998	11
1999	18
2000	9
2001	18
2002	11
2003	6
2004	11
2005	19

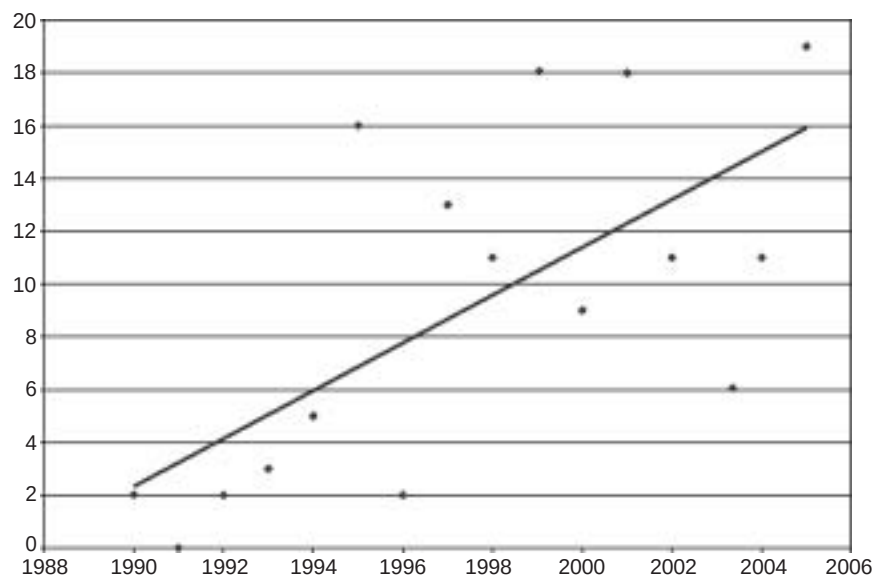
and 1995 yielded 16 GIS articles. Thirteen articles were published in 1997 and 11 each in 1998, 2002, and 2004; 9 articles in 2000; 6 in 2003; 5 in 1994; 3 in 1993; and 2 each in 1990, 1992, and 1996.

Though the data analysis of the results illustrated in Table 1 and Figure 1, the first hypothesis is supported by the collected data. While the numbers fluctuate by year, the trend line illustrated in Figure 1 is a positive one and indicates a general increase.

H2: There is a change in the author affiliation of articles on GIS in the last 16 years from those with a background in Geography or Computer Science to those with a Library and Information Science background.

Author affiliation was obtained by reviewing each article for the author's professional title and affiliated organization. Author affiliation data were obtained for each author in instances of multiple authorship. Based on each author's professional title and organizational affiliation, each author was classified by year of publication into one of the following

FIGURE 1. Number of GIS Publications per Year



categories: "Academic Librarian," "LIS Academic," "Other Academic," "Corporate," or "Government."

Two hundred and twenty-eight authors produced the one hundred forty-six articles in this study. Ninety-three articles (64%) were produced by a single author, thirty-six (25%) by two authors, and seventeen (12%) by three or more authors.

The majority of authors in this study, one hundred thirty (57%), were either librarians or LIS academics. Sixty-six (29%) were academics and researchers from other fields, and thirty-two (14%) were affiliated with a government entity or corporation.

Authorship of the articles in this study is roughly divided between academic instructors, researchers, and graduate students (102 or 45%), be that LIS or other academic departments, or academic librarians (93 or 41%).

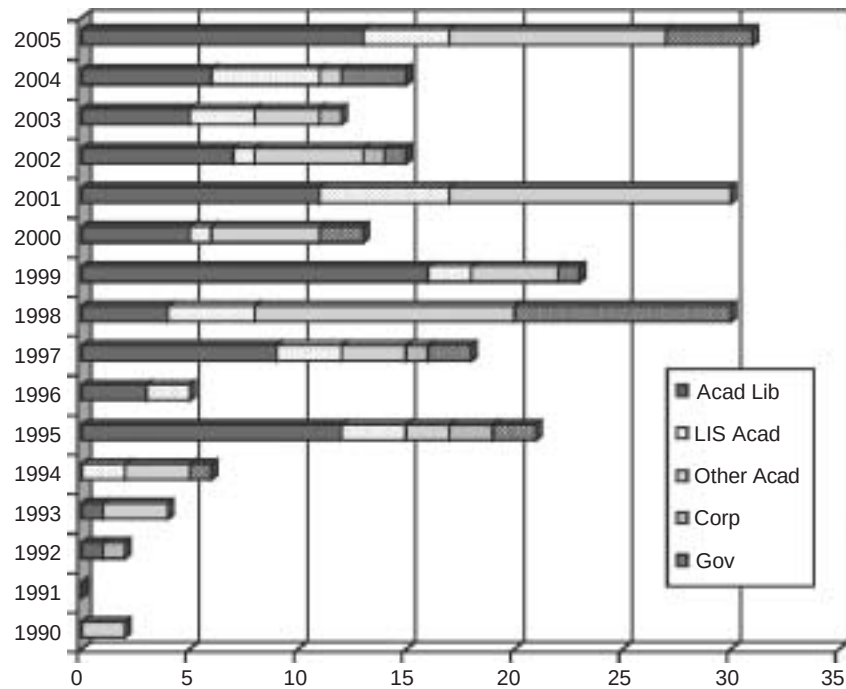
Through the data analysis of the results illustrated in Table 2 and Figure 2, H2 is not supported by the collected data. There is no clear trend in the author affiliation of articles on GIS in the last 16 years from

TABLE 2. GIS Article Year of Publication by Author Affiliation

	Academic Librarian	LIS Academic	Other Academic	Corporate	Government
1990	0	0	2	0	0
1991	0	0	0	0	0
1992	1	0	0	1	0
1993	1	0	3	0	0
1994	0	2	3	0	1
1995	12	3	2	2	2
1996	3	2	0	0	0
1997	9	3	3	1	2
1998	4	4	12	0	10
1999	16	2	4	0	1
2000	5	1	5	0	2
2001	11	6	13	0	0
2002	7	1	5	1	1
2003	5	3	3	1	0
2004	6	5	1	0	3
2005	13	4	10	0	4
Total	93	36	66	6	26

Note: One author affiliation that did not fit into any of the above categories was a public librarian.

FIGURE 2. Author Affiliation by Publication Year



those with a background in Geography or Computer Science to those with a Library and Information Science background.

DISCUSSION

The analysis of the yearly quantity of articles authored on GIS in *Library Literature & Information Science* and *Library, Information Science & Technology Abstracts* databases indicates a generally increasing trend from 1990 to 2005.

The examination of author affiliation of GIS articles in LIS literature indicates that authorship on this subject is primarily in the academic arena with LIS academic instructors, academic instructors from other

disciplines (primarily geography and computer science), and academic librarians authoring most of the articles on the topic. Almost half of the articles in this study were authored by academic instructors and researchers, and almost half by academic librarians. The data indicate no clear change in publication pattern over time by author affiliation.

SUGGESTIONS FOR FURTHER STUDY

This study explored the topic of GIS in Library and Information Science literature but was limited to two areas—publication pattern and authorship. There are other feature areas that may contribute to a more complete picture of the trends of GIS in Library and Information Science journals such as content analysis and degree of collaboration between disciplines.

This study was limited to research and feature articles available in two major LIS databases. A broader study of the body of GIS literature in general may provide a more accurate and complete picture of publishing and authorship trends.

Note: Data for this study in Excel format are available at: <http://ocean.otr.usm.edu/~w146169/GISdata.xls>.

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